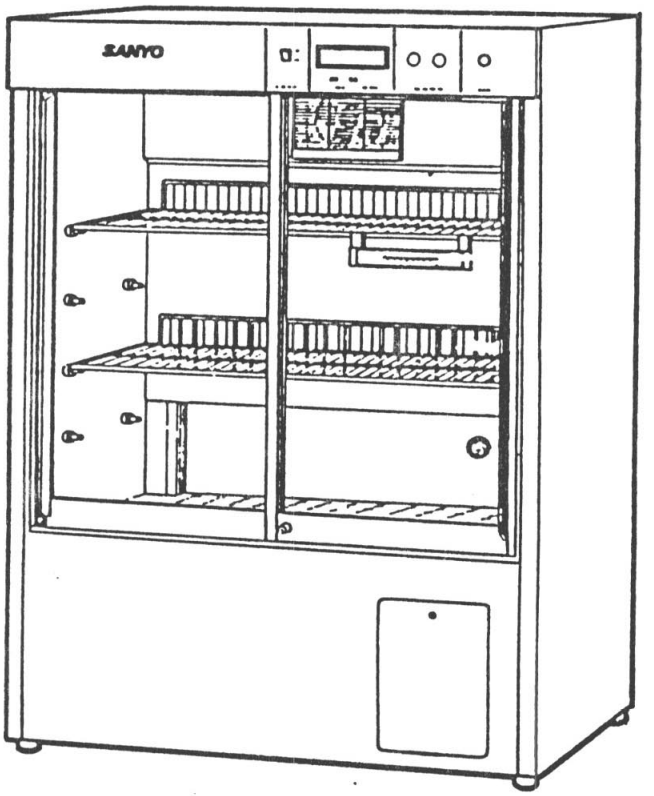
SANYO

JUNE 1989

Service Manual — Medical Refrigerator — MPR 161D



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*

Destination	Model	V / Hz	Product code
Philippines	MPR 161D	220V / 60Hz	823-223-71

* All-transformer system

1. Features

■ The temperature interior the refrigerator is stable.

Electronic temperature controller
An electronic temperature controller (digital on deluxe type units) having a thermistor sensor, which can vary the temperature from 2 to 14 °C, is used.

Circulation fan motor interior the refrigerator
This reduces the temperature difference between different parts of the refrigerator, and restores the uniformity of temperature after the door is opened and closed.

Heater type cycle defrost system
Defrosting is done during normal use, without affecting the temperature interior the refrigerator.

Alarm devices included
In case the temperature should change abnormally, alarm (lamp and buzzer) and safety (thermostat) devices are incorporated.

■ Supervision is easy.

Double pair glass with heat-reflective film
Radiative heat rays and ultraviolet rays are cut out, preventing temperature increase and deterioration of stored items.

Thermograph can be installed.
An optional accessory MTR-0620LH thermograph can easily be installed.

■ Sliding door type reduces space required to a minimum.

2. SPECIFICATIONS

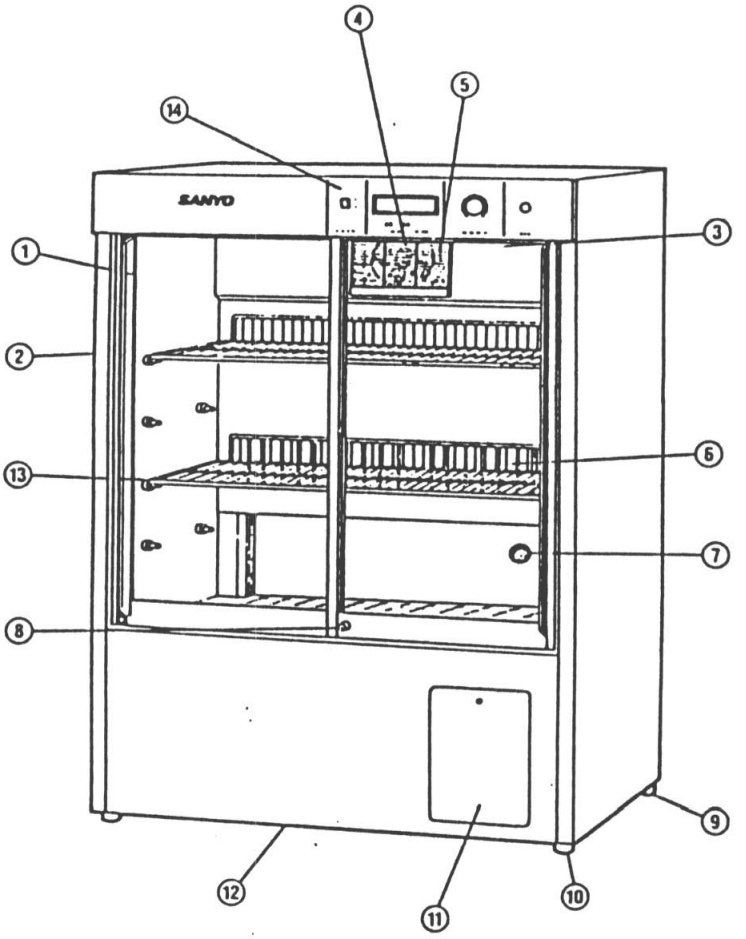
(1) Products

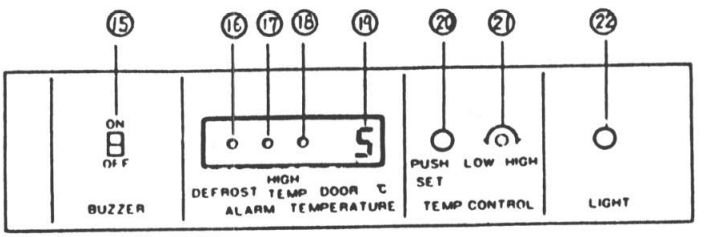
Effective capacity(ℓ)		158ℓ
External dimensions (m/m)		800(W) X 450(D) X 1090(H)
Internal dimensions (m/m)		720(W) X 300(D) X 725(H)
Net weight(Kg)		59Kg
Cabinet	Outer cabinet	Baked on acrylic finish on galvanized steel
	Inner cabinet	Stainless steel plate
	Door glass	Pair glass with heat ray reflection film
Temperature control		Electronic thermostat adaptor (Renge:2-14℃)
Defrosting control		Automatic (Forced heater defrost)
Insulation		Rigit foamed-in-placed polyurethane
Interior lamp		Fluorescent lamp (20W-D32)

(2) Main parts

Compressor	801-091-10 (Out put 90 W)
Starting relay	S46C (4 2329 626 21)
Overload relay	P10AS (4 2329 644 96)
Fixed capacitor	100μF/160V (4 2239 602 10)
Fluorescent lamp	20W (FL20SD) (4 6149 420 03)
Fluorescent lamp ballast	FBC20150A (4 2869 420 17)
Power supply	GS-4252 (4 2519 420 77)
Power transformer	ATR-C600 (4 2519 502 34)
Thermal protector	TH-2(OFF : 28℃)(823 2 5102 105 02)
CONT senser ALM senser DEF senser	TYPE : 502AT-1N 5KΩ-25℃ (Thermistor)
Drain pan heater	100V-38.9W (2570Ω)
Heater (Defrost heater)	88V-70W (112.6Ω)
Cooling fan moter	FL2-011BM (Output : 1 W)

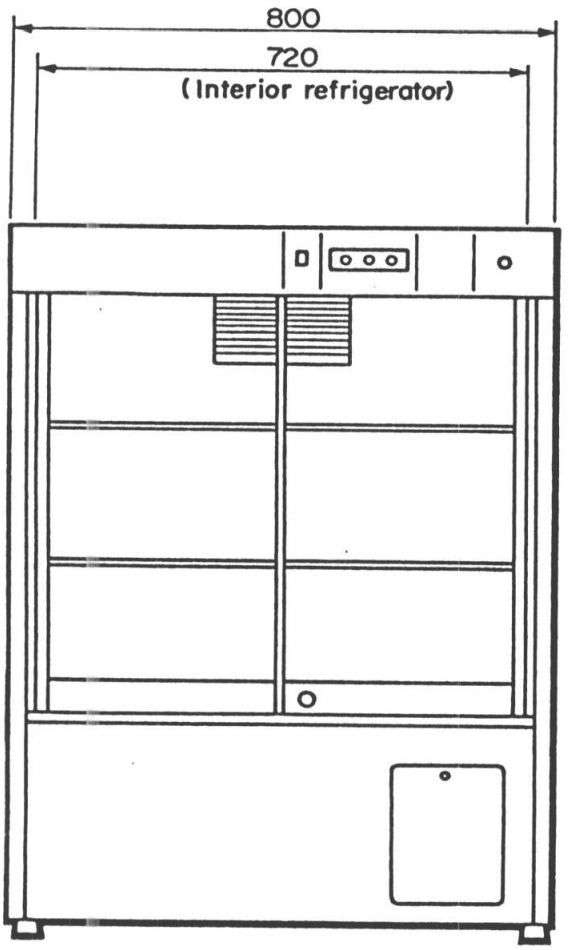
NAME AND FUNCTION OF PARTS

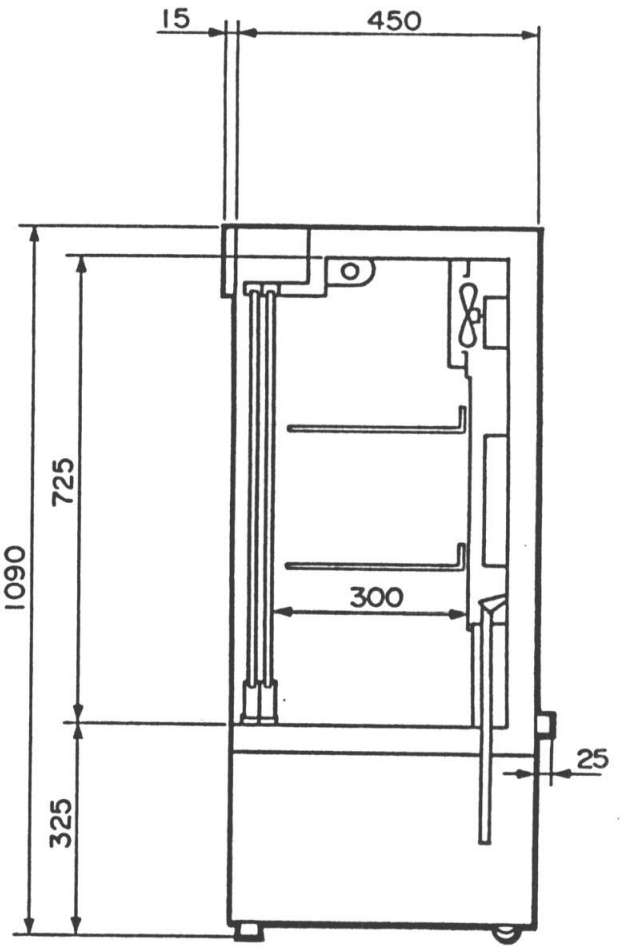




① Door glass
② Frame
③ Fluorescent light
④ Air circulation
⑤ Chilled air intake
⑥ Chilled air outlet
⑦ Monitoring hole
⑧ Lock
⑨ Casters
⑩ Adjusting mounts
⑪ Setting spot for temprature recorder
⑫ Evaporation tray
⑬ Shelf
⑭ Control panel
㉒ Florescent lamp switch
⑯ Defrost lamp
⑰ High temprature warning lamp
⑱ Door check lamp
⑲ Digital thermometer
⑳ Setting button
㉑ Temprature control knob
⑮ Buzzer switch

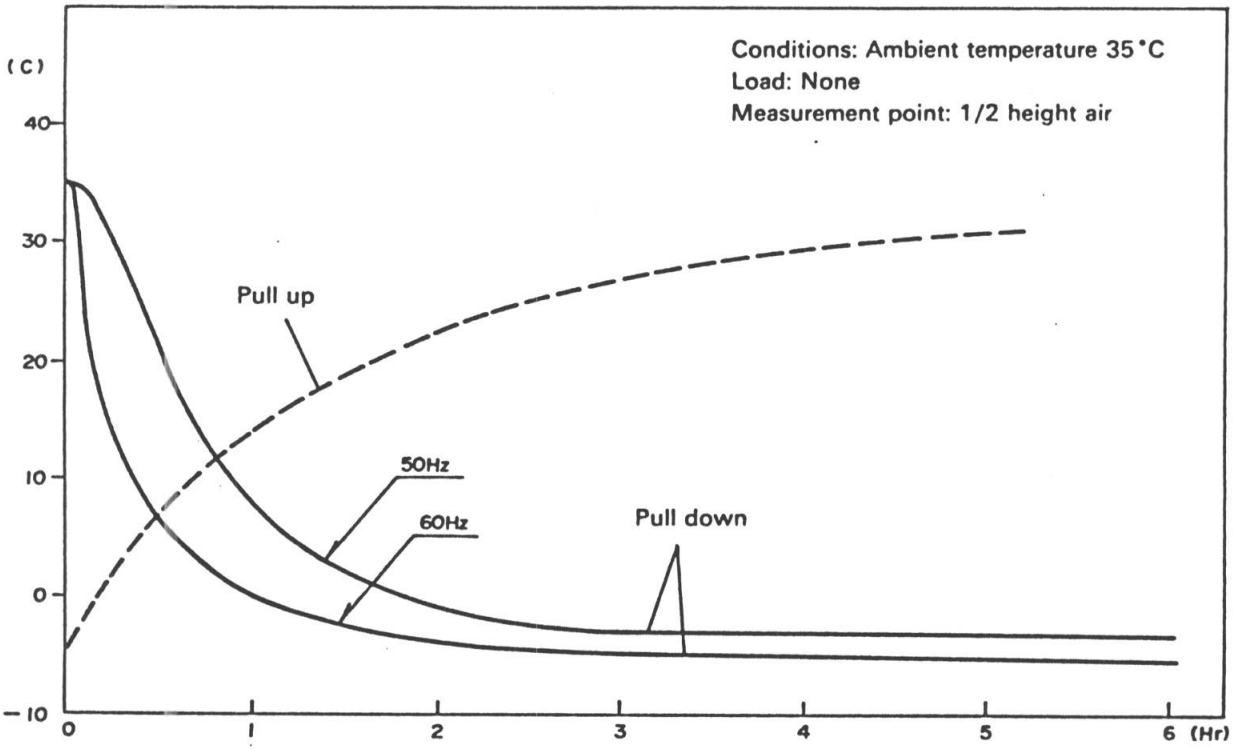
3. Schematic diagram



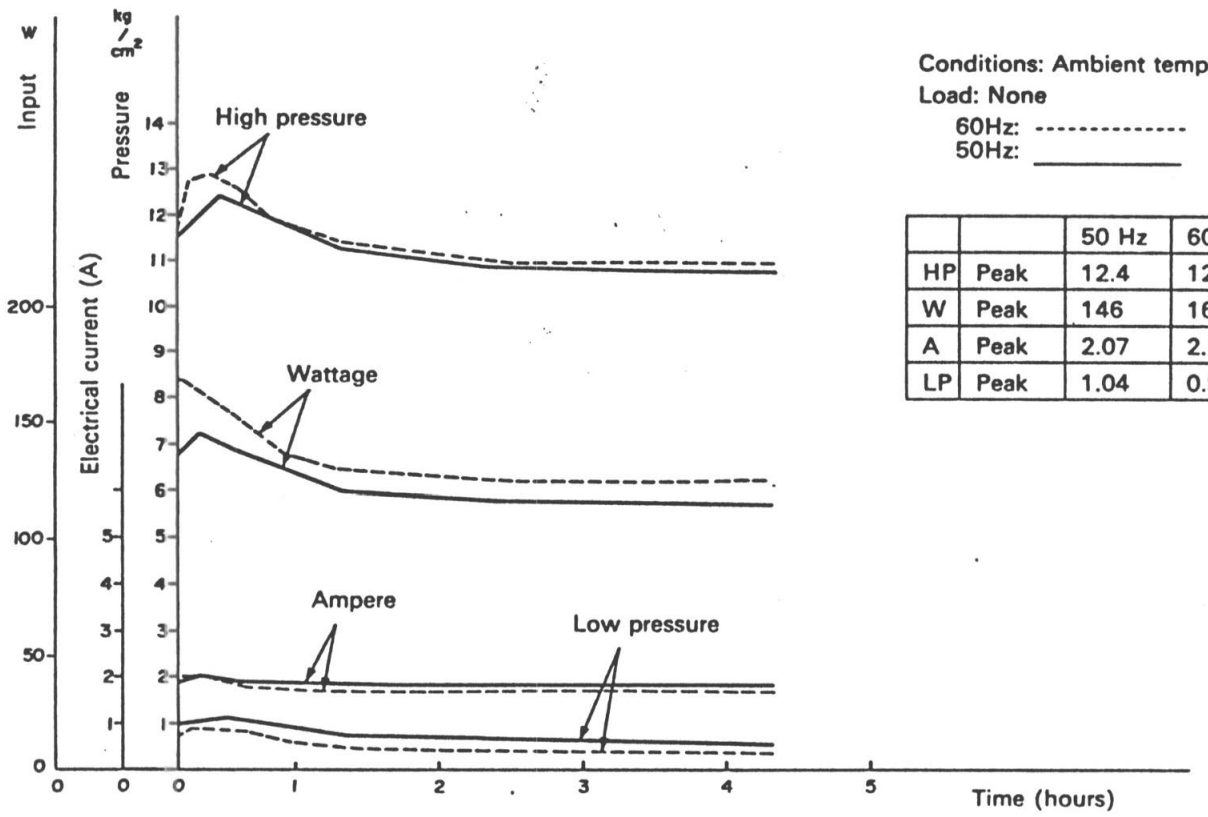


4. Performance

(1) Pull-down/pull-up characteristics



(2) pressure/etc. characteristics



Conditions: Ambient temperature 35 °C
Load: None
60Hz: ----------
50Hz: ——————

		50 Hz	60 Hz
HP	Peak	12.4	12.9 kg/cm²G
W	Peak	146	166 W
A	Peak	2.07	2.10 A
LP	Peak	1.04	0.96 kg/cm²G

(3) Instructions for use

■ Functions of control switches, lamps and knobs

Temperature setting and temperature specification (standard type)
To adjust the temperature interior the refrigerator, turn the temperature control dial (TEMP CONTROL) until the dot is opposite the desired temperature on the scale plate. A thermometer interior the refrigerator indicates the temperature.

CAUTION:
If the accurate temperature interior the refrigerator is needed, install a standard thermometer or one of similar accuracy in the center. That temperature reading can be used to set the temperature.

High temperature alarm lamp (HIGE TEMP)
This lamp indicates that the temperature interior the refrigerator has risen abnormally. This lamp will sometimes light up when the refrigerator is started in a location where the ambient temperature is high, but this does not indicate a malfunction. After the refrigerator has operated for a while the lamp will go off. Wait until it goes off before inserting objects to be stored.

On defrosting
Defrosting is a function of the heater incorporated into the cooler and takes place while the refrigerator continues to operate, although under normal conditions little defrosting is necessary. When an object giving off considerable moisture is stored in the refrigerator or a large quantity of humid ambient air enters, the defroster automatically operates. The cooling fan interior the refrigerator continues to operate and there is almost no effect on the temperature of the stored objects, so there is no need to remove them.

Defrost alarm lamp (DEFROST)
This lamp lights up while the cooler is being defrosted. When the ambient air has high temperature and high humidity or when an object which gives off a large quantity of moisture is stored in the refrigerator, defrosting is carried out and the DEFROST lamp lights up. The freezer stops while the lamp is lit, but there is almost no effect on the temperature of stored objects. This lamp also lights up whenever malfunction causes the temperature interior the refrigerator to drop abnormally (to less than about –2 °C).

Alarm buzzer (BUZZER)
The buzzer sounds in the following cases.
- When the temperature interior the refrigerator is about 20 °C or more
- When the temperature interior the refrigerator is about –2 °C or less

When ⑥ is turned OFF, the buzzer stops.

Power lamp (POWER)
This lights up when power is being supplied to the unit.

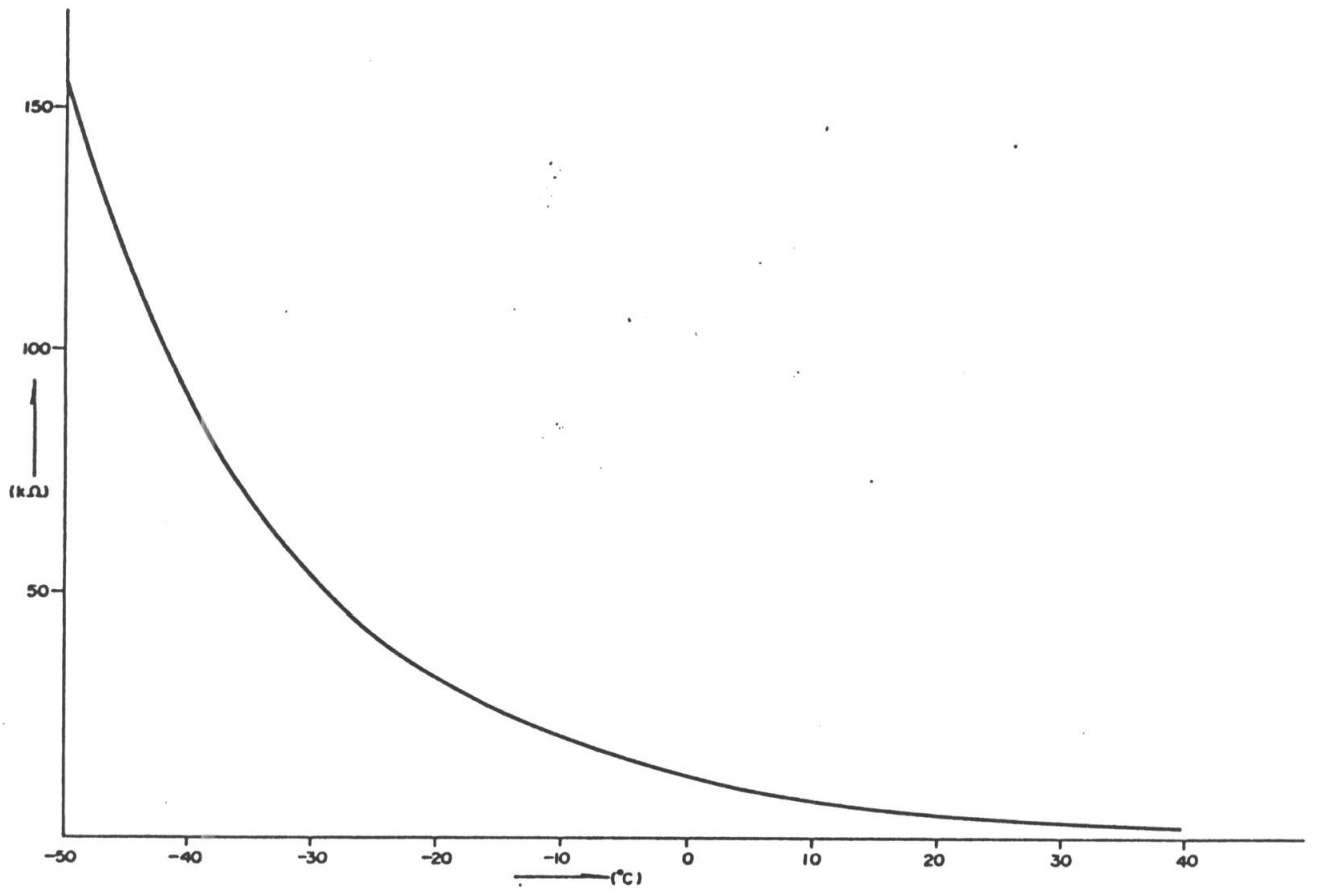
Fluorescent light switch (LIGHT)
Push this switch in all the way to turn the fluorescent light on. Push it in again to turn the light off.

CAUTION

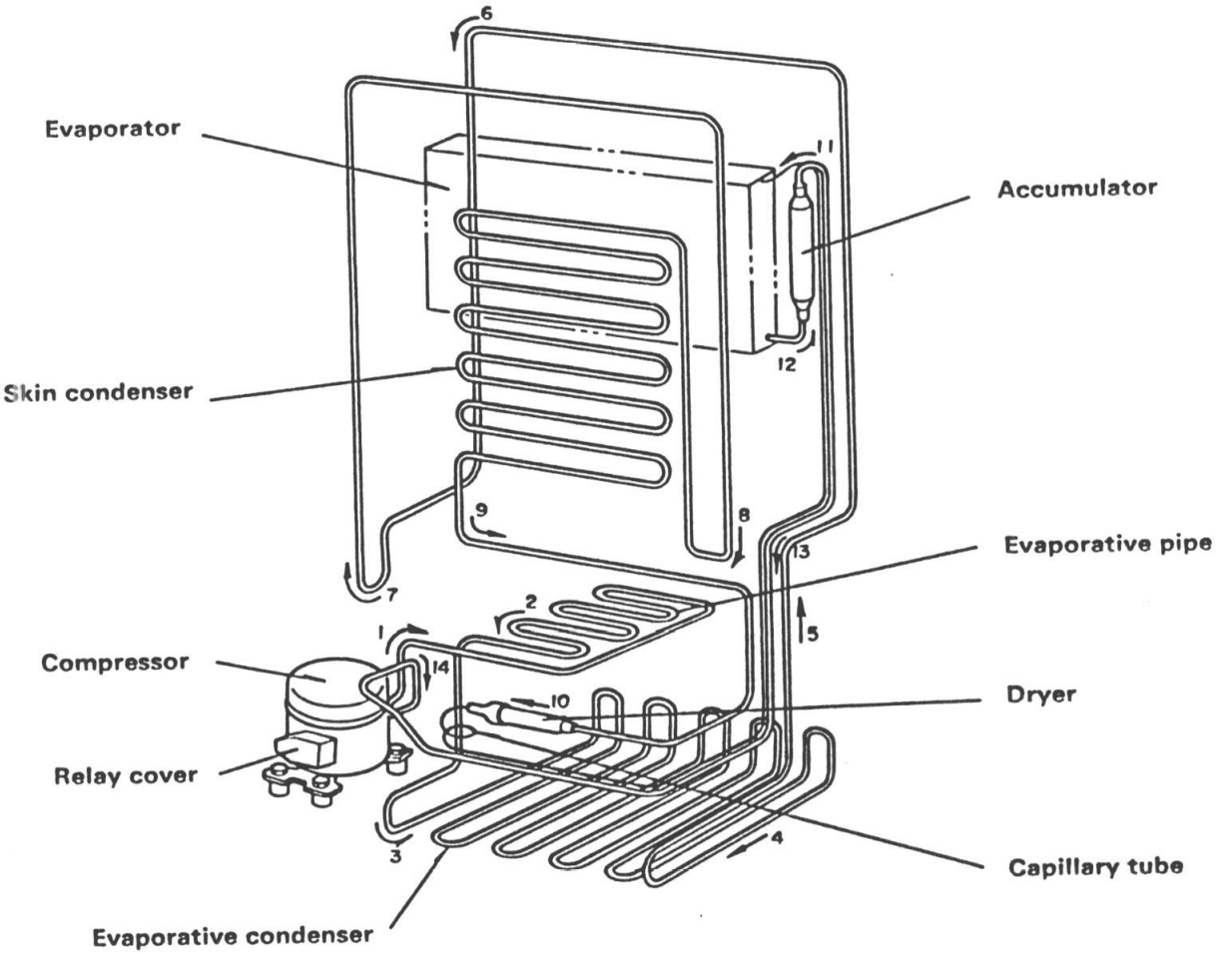
1. The interior of the refrigerator is cooled by forced cold air flow. Please do not block the cold air intake and outlet ports, or let waste paper or other foreign matter enter the intake. Also, keep the objects stored interior the refrigerator a safe distance away from the ports.
2. If water condenses on the front glass or outside of the frame, wipe it off with a soft dry cloth.
3. When the ambient temperature is high, the fan inside the refrigerator might not operate at first, in which case the high temperature alarm lamp will light up and the buzzer will sound. Once the interior temperature drops, these alarm devices will automatically shut off. If the buzzer sound is bothersome, turn the buzzer switch OFF, but be sure to turn it back ON once the interior temperature has dropped.
4. Fasten the shelves in place securely. If objects are to be placed on the floor, do not place them directly on it, but use an accessory duckboard.
5. Make sure the door is closed completely. If it remains open frost will form and the interior will not cool sufficiently. In the D.DR type, when the door is open a door check lamp lights up and the buzzer sounds.
6. The temperature control dial can be turned to a setting lower than 2 °C, but avoid leaving it at that setting for a long time. As a rule keep the temperature setting at 2 °C or more. Also, when it is set at 14 °C, depending on the temperature cycle the buzzer might sound, but this does not indicate a malfunction. In such a case turn the buzzer switch OFF.

(4) Sensor (502AT) temperature characteristics

temperature (°C)	resistance (kΩ)	temperature (°C)	resistance (kΩ)	temperature (°C)	resistance (kΩ)	temperature (°C)	resistance (kΩ)
–50	154.5	–30	52.84	–10	20.48	10	8.839
–49	145.9	–29	50.23	–9	19.58	11	8.494
–48	137.8	–28	47.77	–8	18.73	12	8.166
–47	130.2	–27	45.45	–7	17.92	13	7.852
–46	123.1	–26	43.26	–6	17.16	14	7.552
–45	116.5	–25	41.19	–5	16.43	15	7.266
–44	110.2	–24	39.24	–4	15.74	16	6.992
–43	104.4	–23	37.39	–3	15.08	17	6.731
–42	98.87	–22	35.65	–2	14.45	18	6.481
–41	93.70	–21	33.99	–1	13.86	19	6.242
–40	88.85	–20	32.43	0	13.29	20	6.013
–39	84.18	–19	30.92	1	12.74	21	5.792
–38	79.80	–18	29.50	2	12.22	22	5.581
–37	75.67	–17	28.14	3	11.72	23	5.379
–36	71.80	–16	26.87	4	11.25	24	5.185
–35	68.15	–15	25.65	5	10.80	25	5.000
–34	64.71	–14	24.51	6	10.37	26	4.821
–33	61.48	–13	23.42	7	9.959	27	4.650
–32	58.43	–12	22.39	8	9.568	28	4.487
–31	55.55	–11	21.41	9	9.195	29	4.329



5. Refrigeration unit



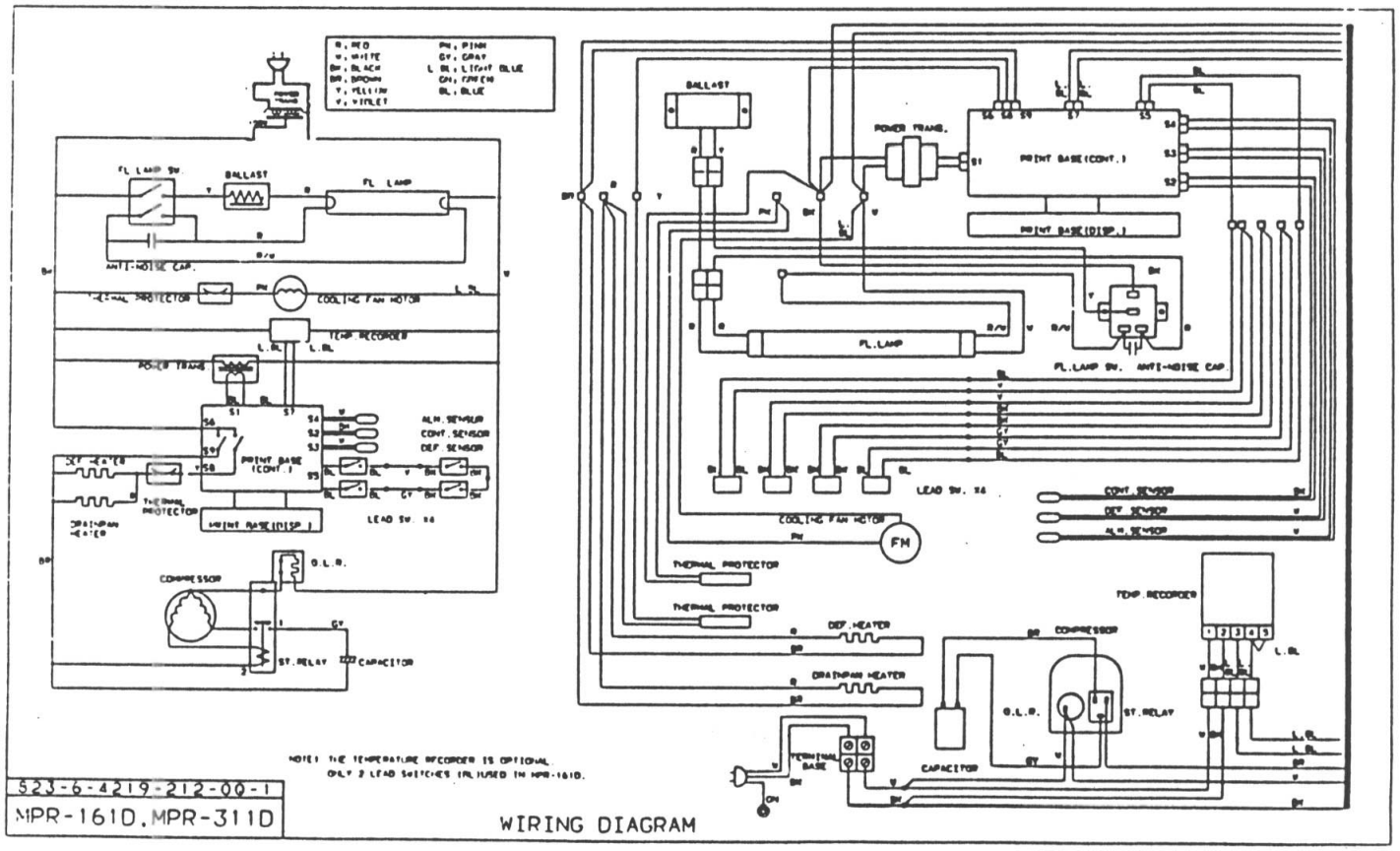
- This refrigeration unit uses a reciprocating compressor of hermetic seal type; the output is 90 w.
- The refrigerant is R-12; charge 100±5 gr.
- An evaporation tray is placed on the evaporative condenser and an evaporative pipe is placed on the evaporation tray in order to lower the condensation temperature. This model uses a skin condenser type.

■ Refrigeration circuit

Compressor ⧫ Evaporative pipe ⧫ Evaporative condenser ⧫

Skin condenser ⧫ Dryer ⧫ Capillary tube ⧫ Evaporator ⧫ Accumulator ⧫ Compressor.

6. Electric diagram

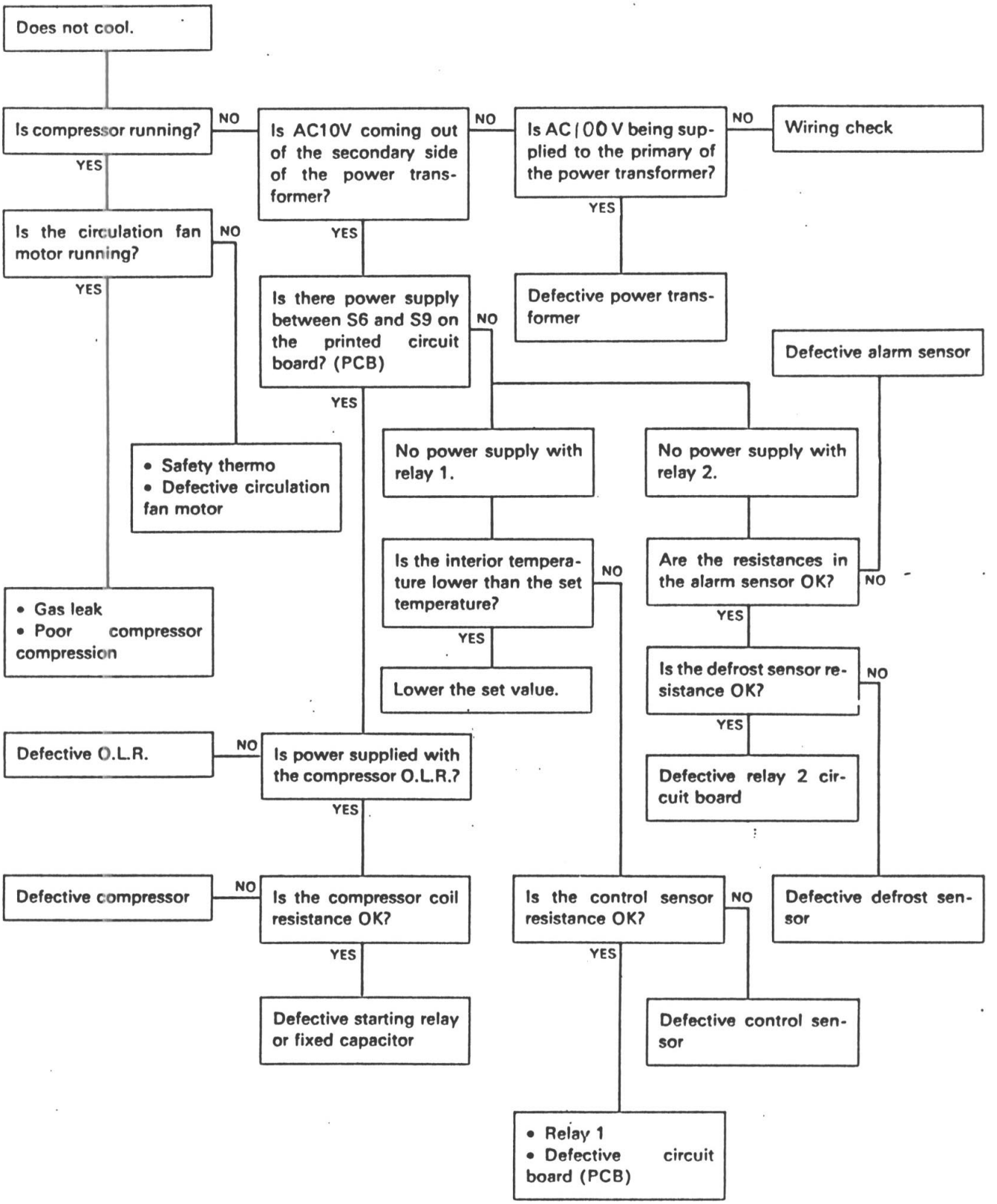


- Normally temperature is controlled by sensing the temperature with a temperature control sensor; when the compressor stops power is supplied to the DEF heater.
- When the evaporator surface temperature becomes about –17°C or less, the DEF sensor causes the S6 and S8 contact to come ON, and the DEF heater comes ON.
- When the evaporator surface temperature reaches about 8°C, the S6 and S9 contact comes ON, the DEF heater goes OFF and cooling operation starts.

Parts name	220 V/60 Hz	Operation
Defrost heater	70 W	Defrosting the evaporator, and energizing the heater when S6 and S8 are ON.
Drain pan heater	38.9 W	Preventing defrosting water from re-freezing, and energizing the heater when S6 and S8 are ON.

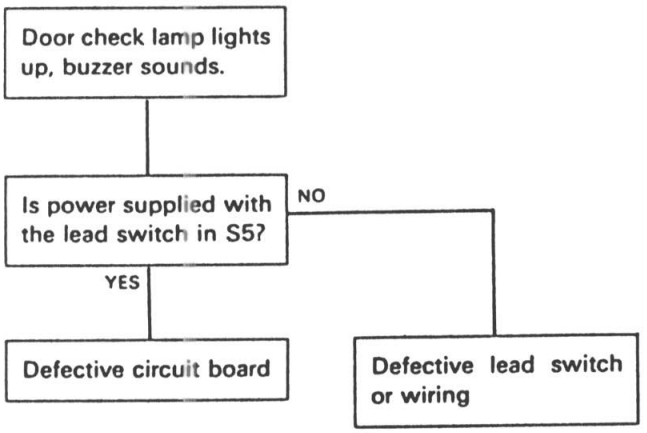
7. Troubleshooting

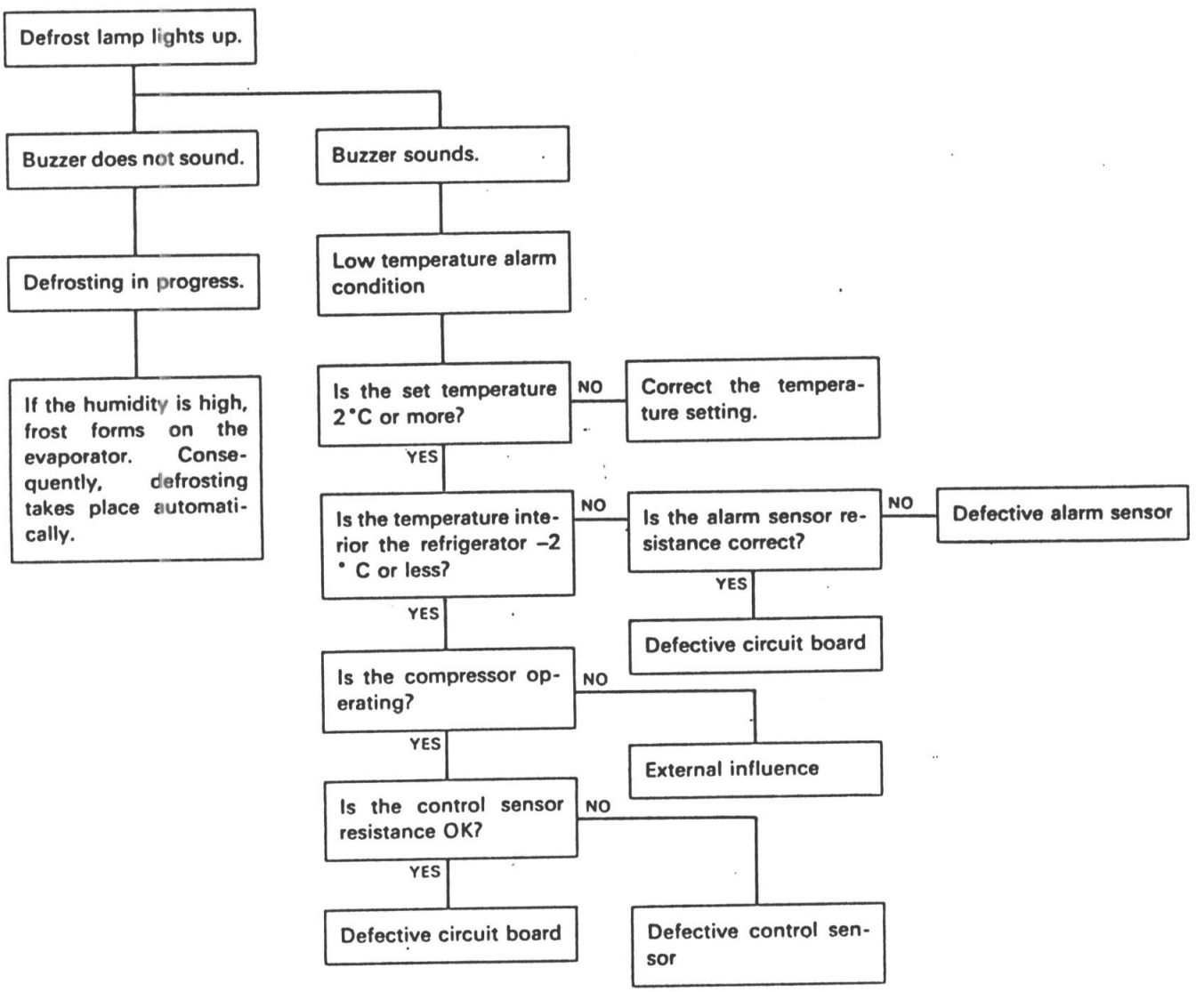
- Check to make sure that AC 100 V is being supplied at the power outlet (or that the power lamp and fluorescent light are lighted up).



■ Alarm

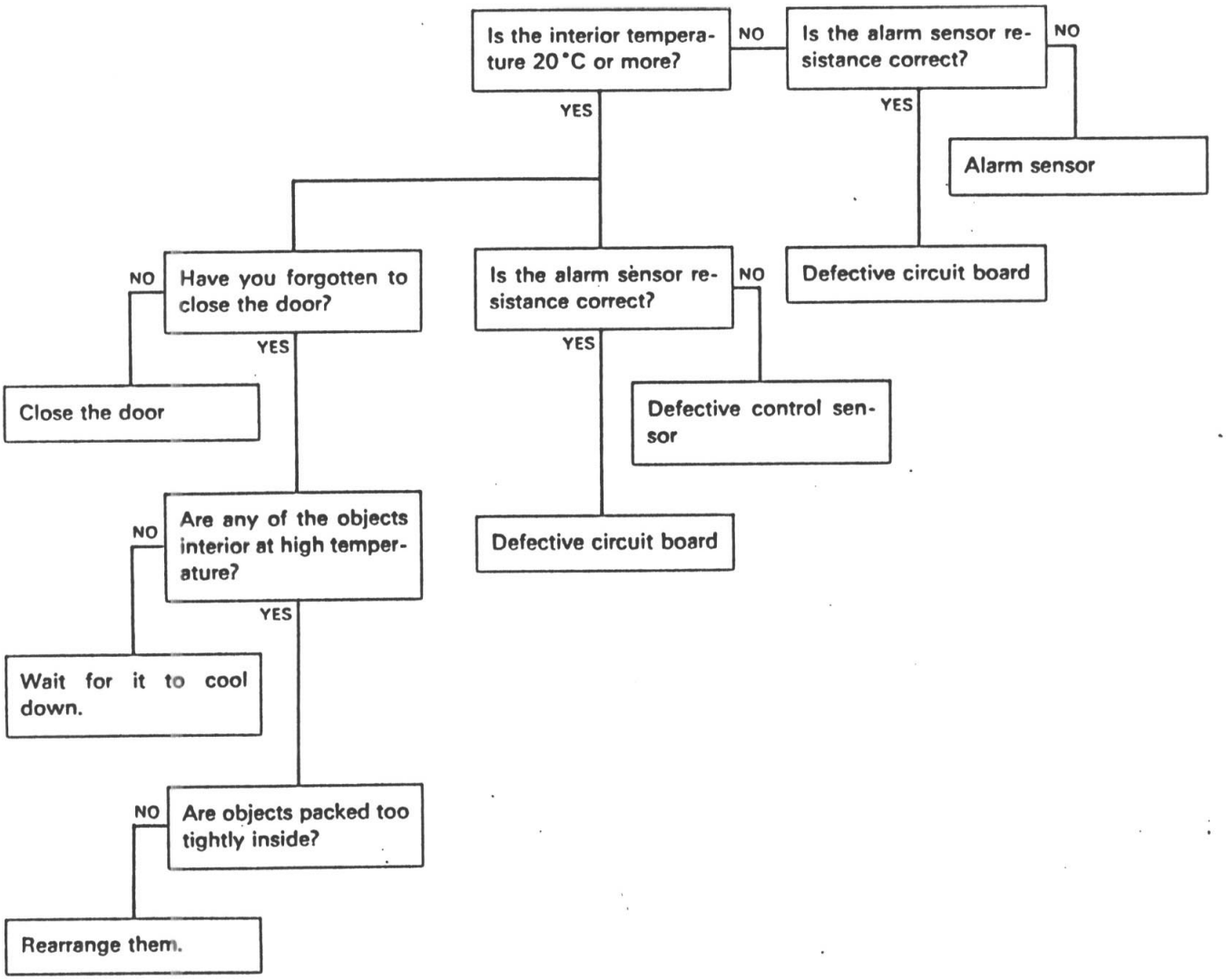
- Doors are all closed.
- Magnet actuator is not raised to where it cuts lead switch off.


Door check lamp lights up, buzzer sounds.
Is power supplied with the lead switch in S5?
NO
YES
Defective circuit board
Defective lead switch or wiring



■ The high temperature alarm operates.

- When the ambient temperature is high, this alarm sometimes operates at the start of refrigerator operation.



■ The digital indication does not agree with the temperature setting.

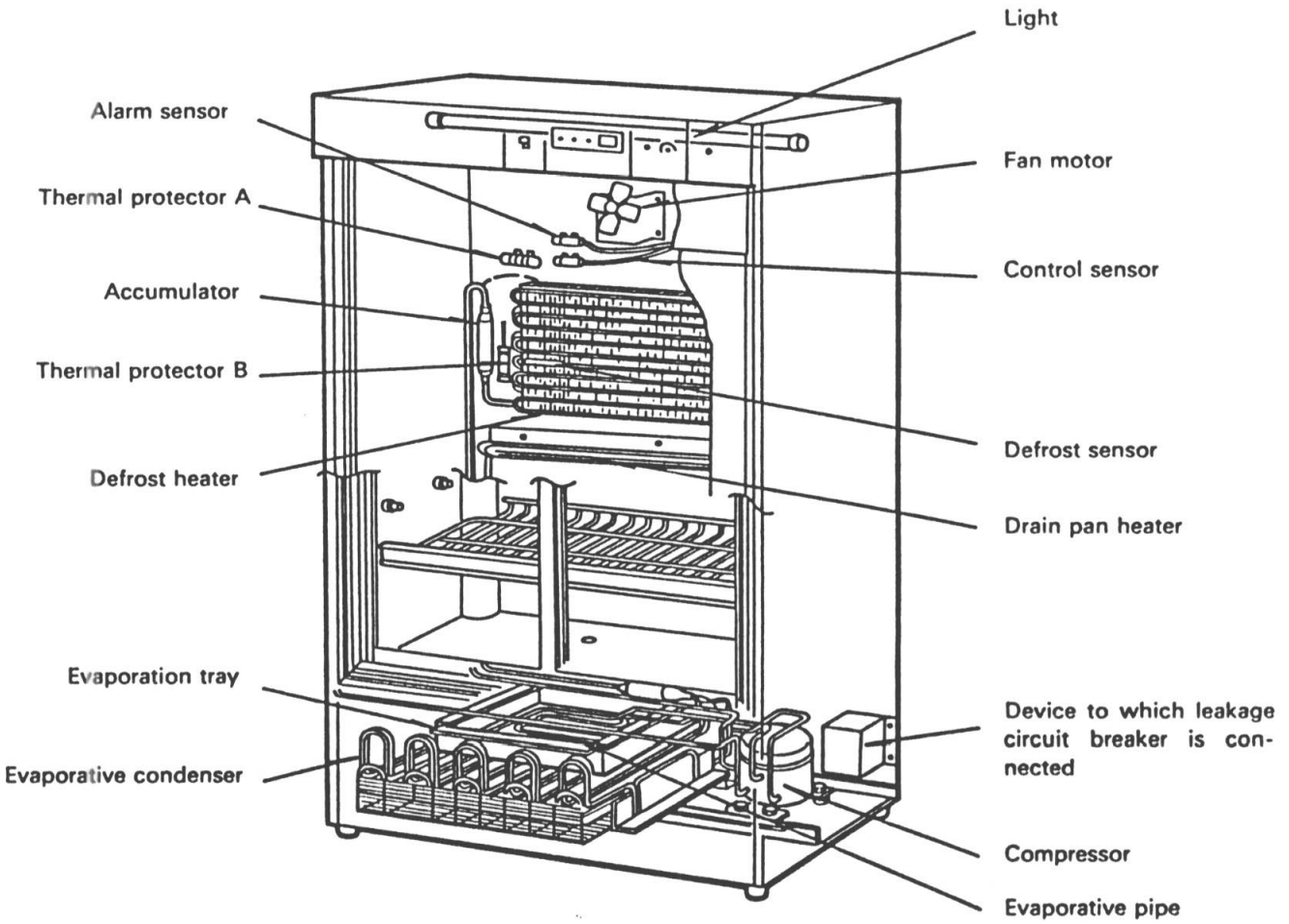
Causes

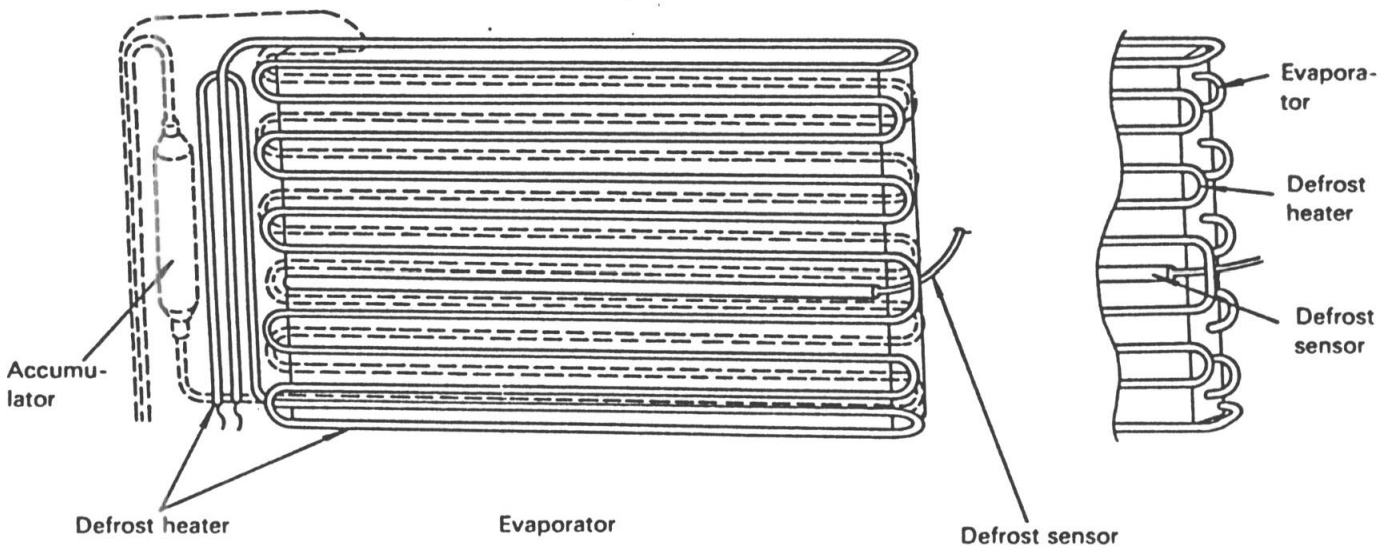
1. The cold air suction hole is blocked.
2. The circulation fan motor is not operatring.
3. The circuit board is defective.
4. The control sensor is defective.

- Whether the resistance of each sensor (thermistor) is correct can be judged from the temperature interior the refrigerator (top of evaporator) and the sensor temperature characteristics table.
- The circulation fan motor will not be supplied until the temperature of thermal protector drops to 18 °C or less. (It stops at 28 °C.)
- The state of each sensor when a wire breaks.

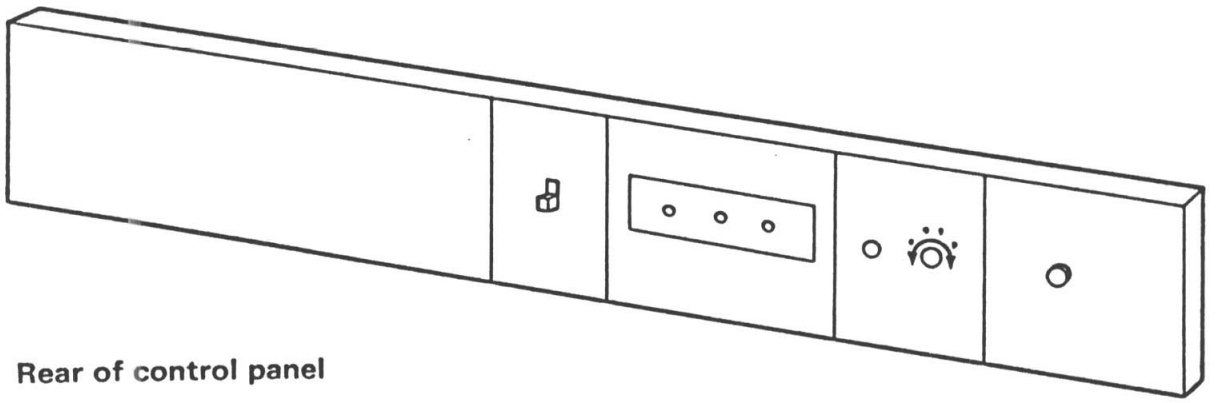
	RLY 1	RLY 2	RLY 3	STATE
Alarm sensor		OFF	ON	Heater operates
Control sensor	ON			Cooling
Defrost sensor		OFF		Heater operates

8. Parts layout

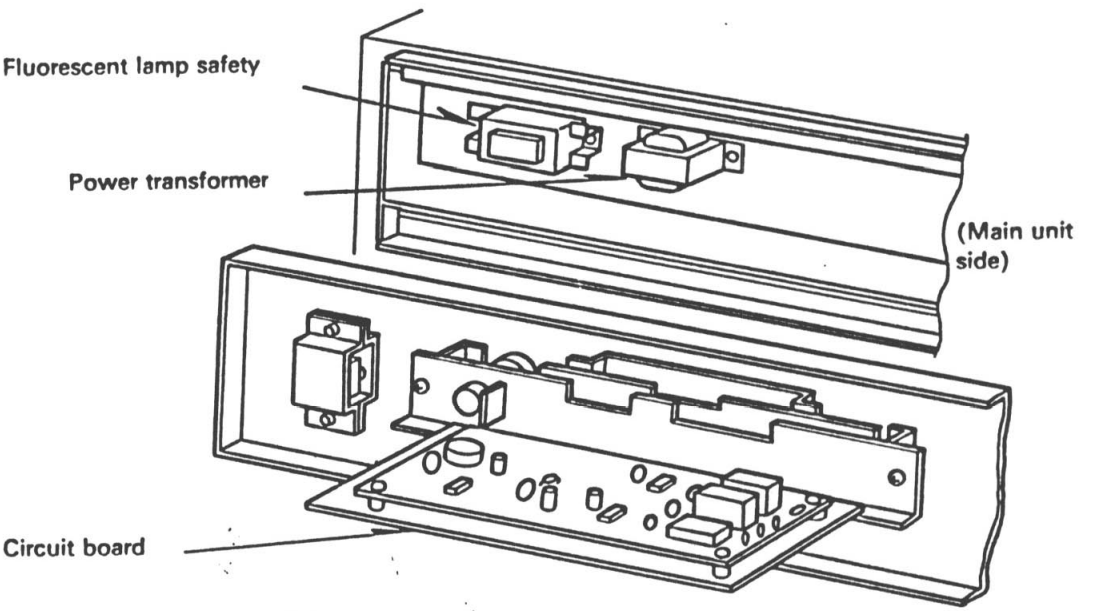




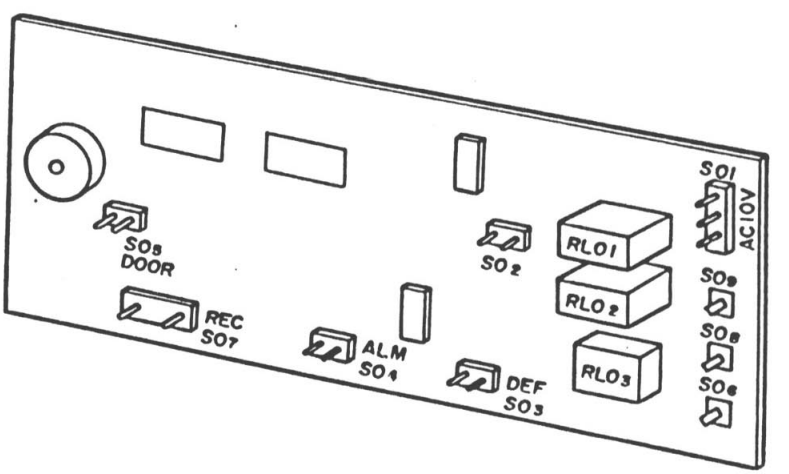
■ Control panel

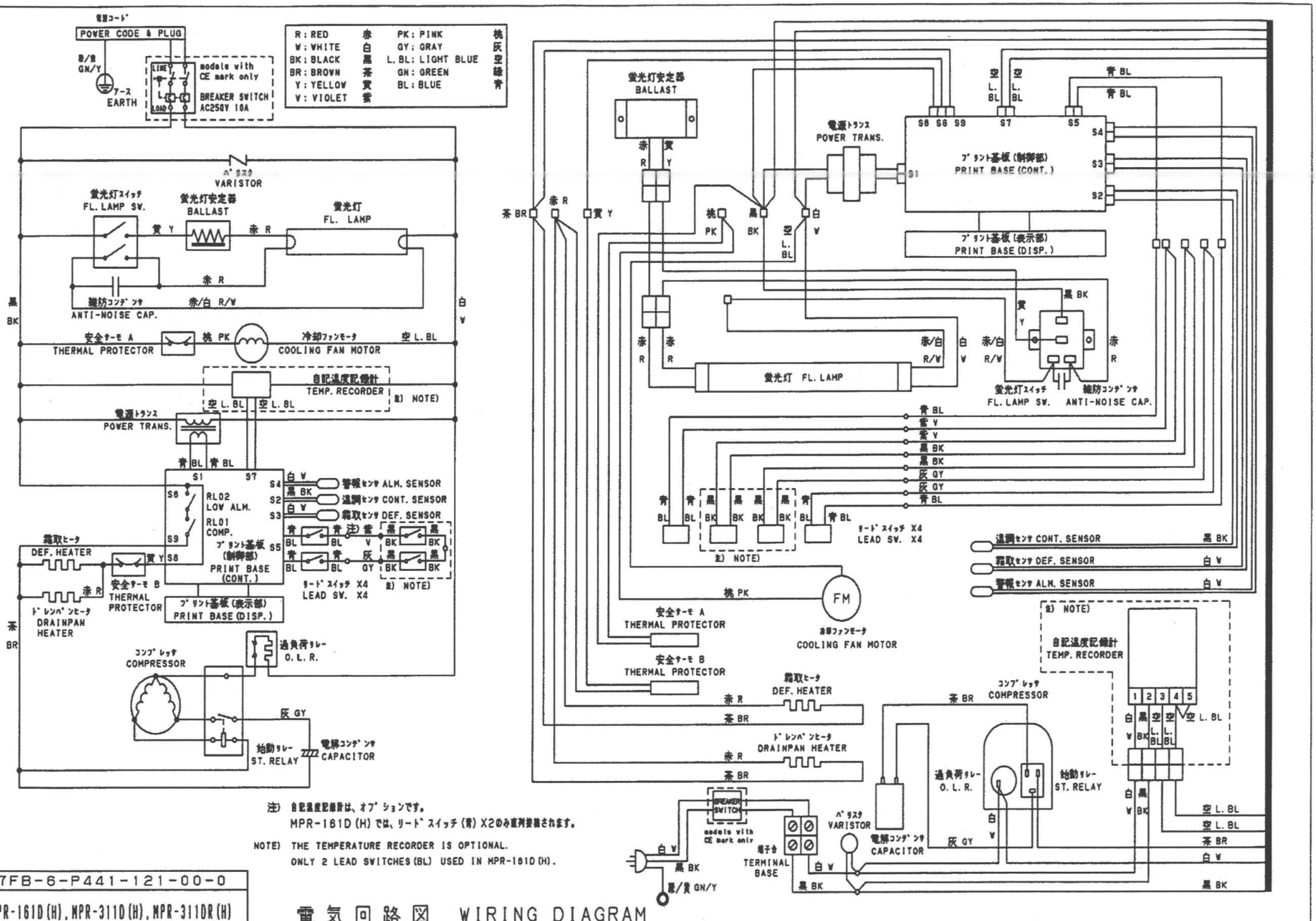


■ Rear of control panel



■ Circuit board





注) 自記温度記録計は、オプションです。
MPR-161D(H)では、リードスイッチ(青)X2のみ直列接続されます。

NOTE) THE TEMPERATURE RECORDER IS OPTIONAL.
ONLY 2 LEAD SWITCHES(BL) USED IN MPR-161D(H).

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MPR-161D(H), MPR-311D(H), MPR-311DR(H)

電気回路図 WIRING DIAGRAM